ATTACHMENT B

Lower AGE Sub-Station Maintenance

Scope of Work

GENERAL

a. Schedule: All work shall be performed during an equipment outage; all power switching is by others. Contractor shall coordinate a proposed outage time with the Contracting Officer (CO) who will coordinate with the Owner's (SpaceX) facility operations personnel. SpaceX requires 14-days minimum to arrange the outage once the date and time is agreed upon.

b. The outage shall be assumed to be performed over a weekend (08:00 Saturday to 20:00 Sunday). Contractor shall staff the job to complete all work in the required outage window.

Testing personnel shall be NETA certified and Square D authorized service representatives.

Provide Test Reports including:

a. Personnel name(s) and Organization(s) performing tests including signatures and dates.
b. All maintenance and test procedures and all test results.
c. Test equipment data including calibration data.

Contractor shall provide all maintenance materials and testing equipment including portable power generation, fuel, portable work lighting and portable power distribution including all portable power cables. No facility power is available once the substation is turned off.

OIL FILLED TRANSFORMERS

Scope of Work:

Visual and Mechanical Inspection

1. Document equipment nameplate data on test report.
2. Inspect physical and mechanical condition.
3. Verify that alarm, control, and trip settings on temperature indicators are as specified.
4. Verify operation of all alarm, control, and trip circuits from temperature and level indicators, pressure relief device, and fault pressure relay.
5. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench.
6. Verify correct liquid level in all tanks.
7. Verify that positive pressure is maintained on nitrogen-blanketed transformers.
8. Verify correct equipment grounding.

Electrical Tests

1. Mark and disconnect primary and secondary conductors.
2. Perform power factor insulation-resistance tests (Doble Tests), winding to winding and each winding to ground.
3. Calculate polarization index.

4. Perform a turns-ratio test. Record existing fixed tap changer setting. Verify that winding polarities are in accordance with nameplate. Additional Test
5. Remove a sample of insulating liquid in accordance with ASTM D 923 and be test for the following:

    A. Dielectric breakdown voltage: ASTM D877 and/or ASTM D 1816.
    B. Acid neutralization number: ASTM D974.
    C. Specific gravity: ASTM D 1298.
    D. Interfacial tension: ASTM D 971 or ASTM 0 2285.
    E. Color: ASTM D 1500.
    F. Visual Condition: ASTM D 1524.
    G. Parts per million water: ASTM D 1533.
    H. Required on 25 kV or higher voltages and on ail silicone-filled units.
    I. Measure dissipation factor or power factor in accordance with ASTM D 924.

6. Reconnect/re-torque primary and secondary conductors.

Low Voltage Switchgear Section:

Work Scope:

1. Clean cable compartment sections and inspect all cable terminations for signs of heat or other damage.
2. Re-torque all cable connections and accessible bus connections.
3. Disconnect all connections to the main power bus and megger main power bus phase to phase and phase to ground at 1000 VDC. Record results.
4. Reassemble as required to energize at the end of the outage.

Low Voltage Draw Out CIRCUIT BREAKERS

3 x “Square D” DS 632 (3200A frame)

Work Scope:

I. Maintenance

1. All maintenance to be done without disassembly, except where disassembly is necessary in order to get the breaker above a minimum acceptable condition.
2. Cleaning: Clean all primary insulation, the mechanism, all main contacts, all arcing contacts, and all control contacts.
3. Lubrication: Re-Iubricate per the Maintenance Section of the Square D Lubrication Manual (no disassembly required) or per manufacturer's recommendations. Further lubrication of the mechanical system and primary current path pivot points will require disassembly, and should only be done as needed to get the breaker above a minimum acceptable condition.
4. Adjustments: Perform all critical checks and adjustments as recommended by the manufacturer.
5. Parts Replacement: Immediately bring to the attention of the COTR and owner any parts requiring replacement.

II. Inspection

1. Perform after maintenance of the breaker.
2. Record all data on the inspection form.

3. Mechanical System: Note the condition of the operating mechanism in terms of wear, lubrication, cleanliness, and adjustments.
4. Primary Current Path: Note the condition of the main contacts, primary disconnects, pivot point lubrication, and adjustments.
5. Primary Insulation System: Note the condition of the primary disconnect stabs and all insulated bracing, linkages, and barriers.
6. Arc Interruption System: Note the condition of the arc chute plates, blow-out coils, arc chute casing, arc runners, arcing contacts, and puffers.
7. Racking Safety Interlocks: Note the condition of the racking mechanism, and test the interlock that prevents racking a closed breaker, the interlock that maintains the breaker in a trip-free condition during a racking operation, and the Interlock that discharges the closing springs when the breaker is removed from the cubicle.
8. Control System: Note the condition of the control wiring, all coils, the charging motor, all relays, all switches, the secondary disconnects, and test the anti-pump circuit.

III. Testing

1. Perform after maintenance of the breaker.
2. Record on the test form.
3. Primary Current Injection
   A. Tests: Record all trip device function settings (Long-Time Pickup and Delay, Short-Time Pickup and Delay, Instantaneous Pickup, and Ground-Fault Pickup and Delay). Test the pickup current of all trip device functions on all phases. For each phase, time the Long-Time tripping function at a test current of 3X pickup current. For each phase, time the Short-Time, Instantaneous, and Ground-Fault tripping functions at a test current of 1.5X pickup current. For all tests, record the acceptable test limits as determined from the time-current curves of the trip device, along with the actual test results for each phase.
4. Charge Circuit Minimum Voltage Operation: Using a variac, determine whether the charging motor will charge the closing springs at the specified minimum voltage.
5. Close Circuit Minimum Voltage Operation: Using a variac, determine whether the closing circuit will close the breaker at the specified minimum voltage.
6. Trip Circuit Minimum Voltage Operation: Using a variac, determine whether the trip circuit will trip the breaker at the specified minimum voltage.
7. Primary Current Path Resistance: Using a 100 Amp micro-ohm meter, measure the resistance of each phase. Test through the primary disconnect fingers and bypassing the primary disconnect fingers.
8. Insulation Resistance Tests:

   A. Primary Insulation: With the breaker closed, measure the insulation resistances between phases and from each phase to ground, at a test voltage of 1000 VDC. With the breaker open, measure the insulation resistances of each phase, line-to-load (across the open contacts), at a test voltage of 1000 VDC.
   B. Control Insulation: Short all secondary disconnect terminals together and measure the insulation resistance from the secondary disconnects to ground at a test voltage of 500 VDC.

<u>Low Voltage Molded Case CIRCUIT BREAKERS</u>

11 x “Square D” MXF36250G
7 x “Square D” MXF36400G
8 x “Square D” MXF36800G

Work Scope:

I. Maintenance

1. All maintenance to be done without disassembly, except where disassembly is necessary in order to get the breaker above a minimum acceptable condition.
2. Cleaning: Clean all primary insulation, the mechanism, all main contacts, all arcing contacts, and all control contacts.
3. Lubrication: Re-Iubricate per the Maintenance Section of the Square 0 Lubrication Manual (no disassembly required) or per manufacturer's recommendations. Further lubrication of the mechanical system and primary current path pivot points will require disassembly, and should only be done as needed to get the breaker above a minimum acceptable condition. Before proceeding with disassembly, bring condition to the attention of the owner and get approval and change order for the additional labor.
4. Adjustments: Perform all critical checks and adjustments as recommended by the manufacturer.
5. Parts Replacement: Immediately bring to the attention of the COTR and owner any parts requiring replacement.

II. Inspection

1. Perform after maintenance of the breaker.
2. Record all data on the inspection form.
3. Mechanical System: Note the condition of the operating mechanism In terms of wear, lubrication, cleanliness, and adjustments.
4. Primary Current Path: Note the condition of the main contacts, primary disconnects, pivot point lubrication, and adjustments.
5. Primary Insulation System: Note the condition of the primary disconnect stabs and all insulated bracing, linkages, and barriers.
6. Arc Interruption System: Note the condition of the arc chute plates, blow-out coils, arc chute casing, arc runners, arcing contacts, and puffers.
7. Racking Safety Interlocks: Note the condition of the racking mechanism, and test the interlock that prevents racking a closed breaker, the interlock that maintains the breaker in a trip-free condition during a racking operation, and the interlock that discharges the closing springs when the breaker is removed from the cubicle.
8. Control System: Note the condition of the control wiring, all coils, the charging motor, all relays, all switches, the secondary disconnects, and test the anti-pump circuit.

III. Testing

1. Perform after maintenance of the breaker.
2. Record on the test form.
3. Primary Current Injection Tests: Record all trip device function settings (Long-Time Pickup and Delay, Short-Time Pickup and Delay, Instantaneous Pickup, and Ground-Fault Pickup and Delay). Test the pickup current of all trip device functions on all phases. For each phase, time the Long-Time tripping function at a test current of 3X pickup current. For each phase, time the Short-Time, Instantaneous, and Ground-Fault tripping functions at a test current of 1.5X pickup current. For all tests, record the acceptable test limits as determined from the time-current curves of the trip device, along with the actual test results for each phase.
4. Charge Circuit Minimum Voltage Operation: Using a variac, determine whether the charging motor will charge the closing springs at the specified minimum voltage.

5. Close Circuit Minimum Voltage Operation: Using a variac, determine whether the closing circuit will close the breaker at the specified minimum voltage.
6. Trip Circuit Minimum Voltage Operation: Using a variac, determine whether the trip circuit will trip the breaker at the specified minimum voltage.
7. Primary Current Path Resistance: Using a 100 Amp micro-ohm meter, measure the resistance of each phase. Test through the primary disconnect fingers and bypassing the primary disconnect fingers.
8. Insulation Resistance Tests:

    A. Primary Insulation: With the breaker closed, measure the insulation resistances between phases and from each phase to ground, at a test voltage of 1000 VDC. With the breaker open, measure the insulation resistances of each phase, line-to-Ioad (across the open contacts), at a test voltage of 1000 VDC.
    B. Control Insulation: Short all secondary disconnect terminals together and measure the insulation resistance from the secondary disconnects to ground at a test voltage of 500 VDC.

AUTO THROW-OVER PLC

Scope of Work:

1. Verify the operation of the auto throw over system.
2. Check control and backup power.
3. Check the PLC processor.
4. Check the I/O cards.

No Program, sequence or timing modification will be made unless required.